



Junior Park Explorer

Lassen Volcanic National Park

Bumpass Hell Hike: Nature's Palette





Hot Water, Sulfur, and Acid! Lassen's magma chamber 3 miles below Bumpass Hell is like a furnace heating the waters and steam vents you see and smell! The acidic steam and sulfuric acid packed waters here break down the rocks creating an artist's palette of colors. Take a 3 miles round trip hike to Bumpass Hell to study the hydrothermal features, the colors found there, and how the colors were made. Be prepared to climb 300 feet out of the basin. Please be careful! Stay on the boardwalk, so you don't fall through the thin crust of soil and get burned in boiling waters!

Color Key

- 1. Yellow:** The yellow color and crystals are formed by hydrogen sulfide gases escaping into the air from a fumarole or vent. When the gas escapes, it deposits yellow mineral crystals which are pure Sulphur. Smell rotten eggs? That's the hydrogen sulfide gas.
- 2. White:** The soft, white powdery soil is made of opal and a clay mineral called kaolinite. Sulfuric acid and steam break down volcanic rock. What is left behind are these completely broken down white soils.
- 3. Black or Grey:** Grey and black are seen when sulfuric acid and steam have only partially broken down the volcanic rocks. Grey mud and boiling water are composed of kaolinite clay, silica, and a very fine grained iron pyrite. The black scum seen floating on the surface of the pools is an iron rich compound known as iron pyrite or "fool's gold".
- 4. Red, Tan, or Brown:** The red and tan colors are iron compounds that stained the ground. Iron is found in the water and steam. When the steam escapes into the air the iron is deposited on the ground.
- 5. Green:** The green color is from plants called algae. Algae grows in the cooler parts of the hot spring pools, on rocks, and in the streams.
- 6. Blue:** The blue color is from sunlight. The water is blue for the same reason that the sky is blue: When sunlight hits the water's surface, the light scatters. Blue light scatters the most, meaning that's what reflects back to your eyes.

Look High and Low

Walk all through the Bumpass Hell Basin and climb up both sides of the caldera to make observations. Find at least one example of each thermal feature below. Look for the colors of mud, soil, water, and stains on the ground. Write down the colors you see at each feature. Use the color key page to describe how each color was made.

Thermal Feature	Colors I See	How the Colors Are Formed
<p>Boiling Springs Bubbling pools of water with rising steam; often smelly</p> 		
<p>Fumaroles A dry volcanic vent with rising steam; often smelly</p> 		
<p>Dry Barren Ground The ground in and around the hydrothermal area</p> 		
<p>Mudpots A pool of boiling mud</p> 		
<p>Streams and Pools Hot and cold streams flowing away from the basin. Pools in the basin and above the basin.</p>		

Secret Volcano Message

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Letter Choices (use some twice): O R H A L K C